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The impacts of supervisor – PhD student relationships on PhD students' satisfaction: A case study of Vietnamese universities

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The impacts of supervisor – PhD student relationships on PhD students' satisfaction: A case study of Vietnamese universities

Abstract

This study focuses on investigating impact of supervisor – PhD student relationship on PhD students' satisfaction with their supervisors' supervisory styles and their skill development. A survey was conducted among 430 respondents who both finished or were doing their doctoral study at universities in Northern, Central and Southern cities in Vietnam in social science, economics and business management majors. Findings revealed that the leadership, helping, understanding and responsibility relationship between supervisors and PhD students were positively associated with PhD students' satisfaction with supervisors' supervisory style while the uncertain, dissatisfied and admonishing types of relationships were negatively associated with PhD students' satisfaction. The strict relationship did not negatively affect PhD students' satisfaction with their supervisors' supervisory styles. Furthermore, PhD students' satisfaction with their supervisors' supervisory styles positively influenced their satisfaction with academic skill development during their PhD candidature. Implications and future research directions were then discussed.

Practitioner Notes

1. Leadership, helping, understanding and responsibility relationships are positively associated with PhD students' satisfaction with supervisors' supervisory style. Uncertain, dissatisfied and admonishing relationships are negatively associated with PhD students' satisfaction. The strict relationship does not negatively affect PhD students' satisfaction with their supervisors' supervisory styles. 2. PhD students' satisfaction with their supervisors' supervisory styles positively influences their satisfaction with academic skill development during their PhD candidature. 3. PhD programs managers can base on these findings to better select relevant supervisors and provide supervisors with general guidelines of standard supervisory styles. Besides, supervisors could base on findings of this research to train themselves for satisfactory supervisory styles with PhD students. 4. Regarding the COVID-19 pandemic context, technology mediated communication systems could be used to conduct frequent online academic interaction, share progress or updates on professional development. 5. Other support, including personal protective equipment and protocols, understanding and empathy, guidance and direction, timeline support, and financial support, could be provided for PhD students.

Keywords

supervisory styles, PhD students' satisfaction, supervisor - PhD student relationship

Introduction

In a globalised knowledge economy, PhD education plays an essential role in creating new knowledge and developing new skills for the sake of the whole economy. Postgraduate education programs are expected to train PhD students with problem solving skills, analytical skills, research skills and even academic writing skills. Employers in both industries and academia fields are increasingly in need of a highly skilled workforce equipped with those skills to contribute to economic growth (Walker and Thomson, 2010). This explains why demand for high quality postgraduate education programs in educational institutions is growing. Normally, timely completion rate and quality of PhD dissertations are recognized as success predictors of PhD programs (Yam, 2005). In the PhD journey, a positive and effective relationship between PhD students and their supervisors is paramount to their success (Ali et al., 2016). As a result, research into this relationship might help postgraduate institutions and supervisors boost the quality of research supervision.

Existing literature is abundant on the supervisor – PhD student relationship in PhD education. For example, postgraduate supervision is influenced by research context, faculty issues, supervision pedagogy and supervision models (Gill and Burnard, 2008). Other studies focuses on factors affecting the relationship between supervisor and PhD students including performativity agenda (Brooks and Heiland, 2007), and supervisory styles (Deuchar, 2008). While confirming that good academic relationships between supervisors and PhD students were associated with student satisfaction (Erichsen et al., 2014), most extant literature hasn't tested the impact of supervisory styles on other single factors. Besides, PhD students' satisfaction plays an important role in postgraduate education (Neumann and Rodwell, 2009; Barnes and Randall, 2012; Dericks et al., 2019). Therefore, it is essential to understand factors determining PhD students' satisfaction.

To conclude, prior studies have focused on PhD students' satisfaction with discipline of study (Barnes and Randall, 2012), role of supervisors (Erichsen et al., 2014) or their overall PhD experience (Elliott and Healy, 2001). However, not much has been researched about how satisfied PhD students are with supervisory styles and their academic skill development in PhD candidature. Accordingly, our present study addresses this gap by developing a framework in the setting of PhD education programs at Vietnamese universities to investigate:

- (1) The impact of supervisor – PhD student relationship on PhD students' satisfaction with supervisory styles, and
- (2) The impact of supervisor – PhD student relationship on PhD students' satisfaction with their academic skill development

Theoretical framework: Supervisor – PhD student relationship

Supervisor

A supervisor provides PhD students with access to cultural resources, expertise and learning opportunities (Pearson and Brew, 2002). The supervisor is considered to either “make or break” a PhD (Lee, 2008). In order to be effective supervisors, they need to be competent at several skills to support PhD students to complete their PhD candidature successfully on time. First, communication skills are referred to as being able to both listen and make comments in an open, objective, and constructive way. Second, support-oriented skills mean being able to identify when students need help and to offer them appropriate support. To sum up, because PhD students are provided with professional guidance by their supervisor to produce their research of the highest quality throughout their PhD candidature, supervisors play a crucial role for their successful completion of the research.

Supervisor roles and supervisory styles

Recently, supervisors have taken roles of mentors, shaping students' academic behavior, work ethic, and integrity (Gray and Jordan, 2012). Furthermore, it is expected that a good supervisor encourages, supports PhD students, provides constructive and critical appraisal, and develops PhD students' critical thinking (Gyuris, 2018).

Regarding supervisory roles, Brown and Atkins (1988) suggested PhD supervisors may take the role of a director, a facilitator, an adviser, a teacher, a guide, a critic, a freedom giver, a supporter, a friend, and a manager in the relationship with their PhD students. Similarly, the primary role of a PhD supervisor is also claimed to assure their students' academic progress, integrity and academic rigour (van der Laan et al., 2021). Nevertheless, while there is no universal agreement on which supervisory style is effective for all PhD students (Wright et al., 2007), researchers seem to agree that every supervisory relationship has both intellectual and counselling aspect. Whatever supervisory style, an open and constructive relationship between supervisors and PhD students is a key factor to PhD students' success (PGSS, 2014). To wrap up, supervisor roles and supervisory styles have significant impacts on this relationship (Orellana et al., 2020).

Supervisor – PhD student relationship

The relationship between a supervisor and his or her PhD student has been in an expert – disciple or master – apprentice model in which supervisors have control over many aspects (Hemer, 2012). It is commonly agreed that successful completion of a Ph.D. depends on the quality of supervision and the academic interaction between supervisors and students. For example, social support and interaction that PhD students have with their supervisors are proved to contribute greatly to their study completion (Basturkmen et al., 2014). Agreeably, Hamid and Shah (2018) emphasized the necessity to have healthy academic interactions between supervisors and research scholars to ensure the completion of research projects successfully. Additionally, findings of Pyhältö and associates (2015) and Mainhard et al. (2009) also highlighted the essential role of supervisory interaction. On the other hand, it has been concluded by Armstrong (2004) and Eley and Jennings (2005) that PhD students' dissatisfaction with supervision and poor supervisor – PhD student relationship have resulted in high failure rates for doctoral studies in social sciences.

PhD students' satisfaction

In education, student satisfaction refers to a “short-term attitude resulting from an evaluation of a student's educational experience” (Elliott and Healy, 2001). Schools in general, and higher education institutions in particular, have emphasized the importance of exploring student satisfaction. According to Bryant and Bodfish (2014), student satisfaction was one key performance indicator for educational institutions. Research about student satisfaction is also crucial because it will lead to not only student retention but also their motivation to work harder and achieve success (Al-Sheeb et al., 2018). Regarding PhD education, PhD students' satisfaction is significant because it can be integrated into university rankings (Barnes and Randall, 2012) and completion rates (Neumann and Rodwell, 2009).

Past studies on determinants of PhD students' satisfaction have focused on the direct influence of the intellectual environment of the department, and access to appropriate equipment (Pearson and Brew, 2002). Many others have explored PhD students' satisfaction in terms of discipline of study (Barnes and Randall, 2012), student attributes (Wiers-Jenssen et al., 2002) and roles of supervisors (Erichsen et al., 2014). Overall, existing research suggest that each aspect in the PhD candidature,

summarized as supervisors, departments, peer-groups, facilities, academic qualities and supportiveness, has been found to separately affect PhD students' satisfaction in general. Nevertheless, very little attempt has been made to empirically examine how the supervisor – PhD student relationship influences PhD students' satisfaction with supervisory styles and how this satisfaction influences PhD students' satisfaction with their academic skill development. Therefore, our paper aims at filling in this research gap.

Theoretically, our study is based on the model developed by Wubbels and associates (2006) to describe the relationship type of the supervisor behavior while interacting with PhD students (see Figure 1 below). This model is composed of two dimensions (influence and proximity), represented as two axes, and underlies eight types of behavior: *leadership*, *helpful/friendly*, *understanding*, *giving students freedom and responsibility*, *uncertain*, *dissatisfied*, *admonishing* and *strict relationship*.

In this model, a degree of behavior of supervisors in the relationship with PhD students is clearly mapped with a certain level of Influence and Proximity (see Figure 1). When the Influence is higher, the behavior is displayed on the vertical axis. It is represented on the horizontal axis when the Proximity is higher. Eight sectors that are clearly divided (DC – leadership, CD – helping/friendly, CS – understanding, SC – student responsibility/freedom, SO – uncertain, OS – dissatisfied, OD – admonishing and DO – strict), which means that if a behavior is closer to the model center, the intensity of the behavior is lower (Mainhard et al., 2009).

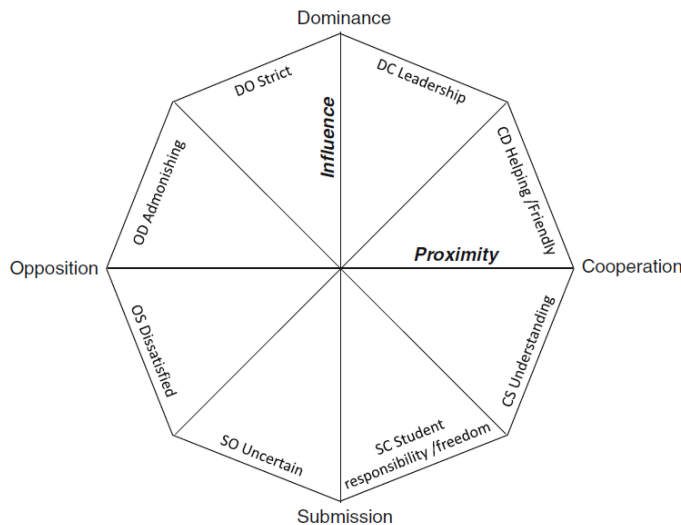


Figure 1

Model for supervisor – PhD student's relationship (Wubbels et al., 2006)

In this model, Wubbels and associates (2006) indicated that the two dimensions of influence and proximity are independent of each other. Specifically, behaviors of both high and low Influence can go together with those of high or low Proximity.

Empirically, firstly, in a review on teacher – student relationships in class, Wubbels and Brekelman (2005) indicated that student satisfaction was positively correlated to leadership, helping, understanding and responsibility. In the same direction, when teachers are helpful and understanding

towards students, students tend to be more satisfied with the course (Tsai, 2017; Hamid and Shah, 2018). Specifically, the relationship between teacher leadership styles and satisfaction levels of graduate students was also highlighted (Adhikary, 2017). In addition, supportive and helpful relationships with teachers are shown to be important predictors of students' satisfaction (Šakić, 2011). Meanwhile, supervisors are also considered as teachers providing PhD students with knowledge related to their research topics and research skills. Therefore, given the above empirical evidence, from the perspective of the model for supervisor – PhD students' relationship (Wubbels et al., 2006), we posited the following hypotheses:

H1a. *The leadership relationship between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H1b. *The helping relationship between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H1c. *The understanding relationship between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H1d. *The responsibility relationship between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.*

Secondly, empirical findings have also proved that when the teacher – student relationship is perceived as uncertain, dissatisfied, and admonishing (Wubbels and Brekelmans, 2005), students tend to be less satisfied with the course. Similarly, it is also confirmed that student satisfaction is negatively associated with uncertain, dissatisfied and admonishing teachers (Tsai, 2017; Hamid and Shah, 2018). In other words, if teachers have uncertain attitudes or dissatisfaction with their students or admonished them more, students are more likely to report lower levels of satisfaction. In addition, students' satisfaction with teachers is claimed to be negatively related to teachers' admonishing behavior (Kokkinos et al., 2009). Besides, Tsai (2017) also suggested that the less strict the teachers were, the higher the academic performance of the students would be, thus leading to their higher satisfaction. Therefore, we would like to hypothesize that:

H2a. *The uncertain relationship between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H2b. *The dissatisfied relationship between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H2c. *The admonishing relationship between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.*

H2d. *The strict relationship between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.*

PhD students' academic skills development

While registering the three- or four-year PhD candidature, PhD students are expected to develop a set of specific research skills. Their goals are to become competent researchers who can conduct research independently and publish research findings across disciplines to solve societal problems or make innovations. As mentioned by van de Laan and associates (2021), both supervisors and PhD students aim at achieving skill development in the learning community afterwards. That's why researchers have argued that the success of a PhD program depends on research skills and attitudes which can be equipped and fostered throughout their PhD candidature (Mainhard et al., 2009). According to Marsh and associates (2002), PhD students need to develop academic skills such as

solving problems, developing ideas and presenting them, analyzing, making plans and tackling unfamiliar problems. Similarly, research students also have to be able to create new knowledge, keep up with the literature and write a thesis, publish and present papers, and complete their doctoral dissertations (Abiddin et al., 2011). Furthermore, academic writing and critical thinking are proved to be essential research skills for postgraduate students (Gyuris, 2018). Likewise, another indicator of academic skill development for PhD students would be research self-efficacy, which means how confident they are with collecting data, analyzing data and writing thesis or journal articles (Overall et al., 2011). Besides, time managements skills are also important, as well (Holsinger Jr, 2008).

Generally, as explained, the success or failure of a PhD student is largely reliant on the supervisor and their academic relationship. PhD supervisors can help and lead PhD students to develop those academic skills by providing academic support, training, guiding, and mentoring (Overall et al., 2011). To further strengthen this argument, Devos and associates (2015) have proved that with no, little or poor academic support of supervisors, the ultimate result would be student dissatisfaction, inability to complete the program on time or even dropout. Therefore, we propose to explore impacts of the supervisor – PhD student relationship on PhD students' satisfaction with academic skills developed during their PhD candidature. The following hypothesis is suggested:

H3: The supervisor - PhD students relationship is positively associated with PhD students' satisfaction with their academic skill development within their PhD candidature.

Our research model is displayed in Figure 2.

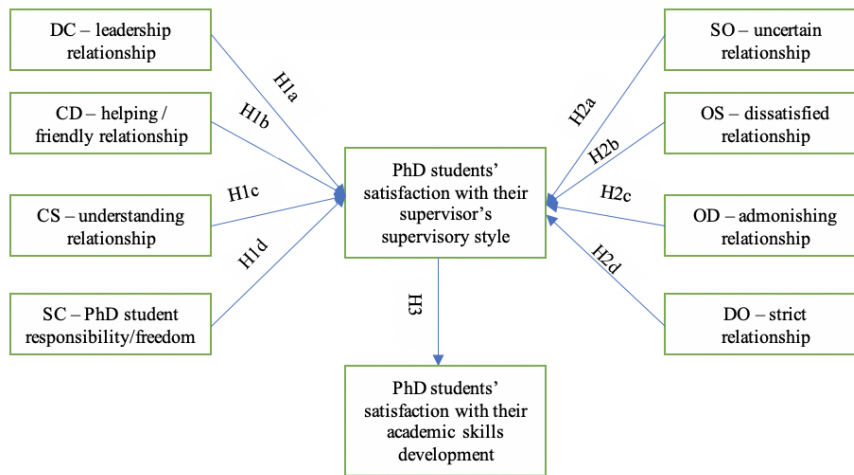


Figure 2

Proposed research model for the impact of supervisor – PhD student relationship on PhD students' satisfaction

Method

Measures

To measure the *supervisor – PhD student relationship*, the questionnaire on supervisor – PhD student interaction (QSDI) developed by Mainhard and associates (2009) was adopted. The QSDI is confirmed to be a reliable and valid instrument to explore the relationship between supervisor and

doctoral students. Some additional background characteristics of PhD students such as age, gender and time spent on the project were also included in the survey questionnaire as control variables. The final version of the QSDI consists of 41 items. Cronbach's α of the eight scales range between 0.70 and 0.87, indicating the reliability of this instrument. Eight scales in the QSDI include *DC-leadership* (6 items), *CD-helping/friendly* (6 items), *CS-understanding* (4 items), *SC-PhD student responsibility/freedom* (4 items), *SO-uncertain* (6 items), *OS-dissatisfied* (6 items), *OD-admonishing* (4 items) and *DO-strict* (5 items). The questions were designed with Likert-type from 1 – Never / Not at all to 5 – Always / Very.

Second, the scale to evaluate *PhD students' satisfaction with supervisor's supervisory style* is adapted from that of Erichsen and associates (2014). The original questionnaire with Likert-type (from 1 – Strongly disagree to 5 – Strongly agree) focused specifically on roles, functions, and behaviors of graduate supervisors. The original items were then adjusted and reworded to fit the PhD context.

Finally, items to evaluate *PhD students' satisfaction with their academic skill development* were adopted from the Postgraduate Research Questionnaire (PREQ) (Ainley, 2001). The PREQ includes five evaluation factors, one of which is related to Skill Development with 5 items of overall high reliability with $\alpha = 0.85$. Therefore, these items are relevant for this present study. The questions are based on the Likert-type (from 1 – Strongly disagree to 5 – Strongly agree).

The resulting questionnaire included 62 items. 41 items measured the academic relationship between supervisor and PhD students, 16 items measured PhD students' satisfaction with their supervisor's supervisory style and 5 items evaluated PhD students' satisfaction with their academic skill development within their PhD candidature.

Participants

Participants in the survey both finished or were doing their doctoral study at universities in Northern, Central and Southern cities in Vietnam. Universities chosen in these cities are in the top list in Vietnamese education league table in terms of the number of PhD education programs, especially in social science, economics and business management and the number of PhD students joining and completing their doctoral study each year. The researchers contacted faculties in Post Graduate Department of each university who were responsible for administrative work. These faculties had email addresses of PhD students who either completed or were doing their PhD study in the previous five years. The researchers asked for support from these faculties by sending emails to their PhD students, inviting them to answer the survey questionnaire. In invitation emails, potential participants were assured that their personal information would be kept confidential and asked to be voluntary to participate in the survey if they were interested. Among 753 emails sent, 430 respondents agreed to participate and completed the survey questionnaires, equivalent to a 57.1 percent rate of response.

Data analysis

Data were input and analyzed with SPSS 22 and AMOS. Statistical techniques will be performed to process the data, including descriptive statistics, factor analysis, reliability analysis and multiple linear regression. Firstly, an exploratory factor analysis (EFA) with varimax rotation was conducted. Based on the EFA results, three items were removed because their corrected Item – Total Correlation was lower than 0.3. When these items were removed, Cronbach's Alpha of each variable ranges from 0.851 to 0.964. With the eigenvalues of 1.095, 10 factors with 59 items (accounting for 69.907% of the variance) were extracted. At this time, four more items were removed because they did not load significantly on different factors (loading under 0.5). Therefore, in the second attempt

of EFA, with the eigenvalues of 1.066, 10 factors with 55 items (accounting for 71.953% of the variance) were extracted. *Satisfaction with supervisory styles* appears to be the most significant because it explained the highest proportion of the total variance (43.297%) and consisted of 14 items, followed by *leadership relationship* (6 items), *helping relationship* (6 items), *satisfaction with academic skills* (5 items), *uncertain relationship* (5 items), *dissatisfied relationship* (4 items), *responsibility relationship* (4 items), *admonishing relationship* (4 items), *strict relationship* (4 items), and *understanding relationship* (3 items). No new factor was formed compared to the suggested hypothetical model.

After that, a confirmatory factor analysis (CFA) was conducted to assess measurement validity with promax rotation, using maximum likelihood confirmatory factory analysis. Then, all constructs were submitted simultaneously for fit assessment in the full measurement model. The structural equation analysis (using AMOS maximum likelihood method) was then applied to estimate path coefficients for each proposed relationship in the structural model.

Results

Reliability and validity of the full measurement model

Because all factor loadings are larger than 0.5, composite reliability of each construct ranges from .844 to .964 (greater than .70) and variance extracted ranges from 59.35% to 84.37%, (greater than 50%), all constructs presented a high reliability and convergence in the measurement models, as shown in Table 1.

Table 1

Measurement reliability analysis

Construct	Items	Reliability		Variance extracted (%)
		Cronbach	Composite reliability	
Leadership	6	0.937	0.938	71.74%
Helping	6	0.93	0.932	69.57%
Understanding	3	0.938	0.940	83.99%
PhD student responsibility / freedom	4	0.863	0.865	61.58%
Uncertain	5	0.904	0.906	65.85%
Dissatisfied	4	0.928	0.933	77.76%
Admonishing	4	0.927	0.930	76.89%
Strict	4	0.851	0.844	59.35%
PhD students' satisfaction with their supervisor's supervisory style	14	0.960	0.961	64.06%
PhD students' satisfaction with their academic skills development	5	0.964	0.964	84.37%

As all average variance extracted (AVE) estimates are greater than 0.5, convergent validity of the model is acceptable (see Table 2). Furthermore, most correlation coefficients squared between any pair of constructs are less than 0.5 and lower than AVE estimates. Thus, the discriminant validity was met.

Table 2*Discriminant validity of measurement scales*

Constructs	1	2	3	4	5	6	7	8	9	10
Leadership (1)	0.717	0.469	0.444	0.143	0.321	0.084	0.147	0.008	0.536	0.311
Helping (2)		0.696	0.564	0.161	0.258	0.168	0.229	0.041	0.537	0.329
Understanding (3)			0.84	0.233	0.262	0.173	0.252	0.038	0.546	0.317
Responsibility / freedom (4)				0.616	0.071	0.042	0.139	0.032	0.220	0.115
Uncertain (5)					0.658	0.213	0.285	0.070	0.428	0.297
Dissatisfied (6)						0.778	0.404	0.107	0.234	0.198
Admonishing (7)							0.769	0.163	0.336	0.213
Strict (8)								0.594	0.071	0.057
PhD students' satisfaction with their supervisor's supervisory style (9)									0.641	0.663
PhD students' satisfaction with their academic skills development (10)										0.844

Note: Numbers in the diagonal are AVEs. Other numbers are correlation squared between variables.

Structural equation model

After each construct was assessed, the full measurement model was analyzed, and results of the structural equation analysis are shown in Figure 3.

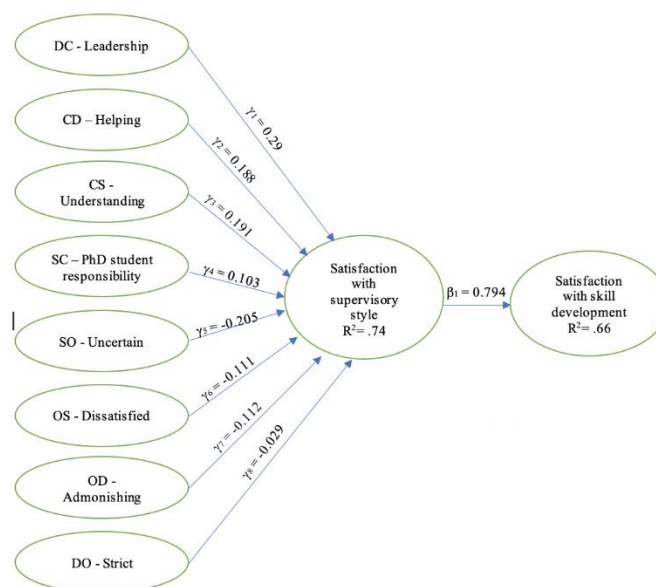


Figure 3*Summary of estimated final model results*

Results of CFA exhibited an acceptable level of fit: $X^2 = 3545.740$, $p < .000$ (.01), $RMR = .053$, $RMSEA = .060$ ($< .80$), $CMIN/DF = 2.545$ (< 3.00), $CFI = .907$, and $TLI = .901$ ($> .90$). Therefore, this model provides adequate fit for the data. Among nine hypotheses tested, eight paths were statistically significant and in the predicted direction while one failed to obtain support from the data. Particularly, strict relationship was insignificantly related to PhD students' satisfaction with their supervisor's supervisory style ($p = 0.197 > 0.05$). Thus, data did not support H2d. Other paths in the model are statistically significant with p value less than 0.001 (H1a, H1b, H1c, H2a, H3) and less than 0.05 (H1d, H2b, H2c). Therefore, these hypotheses (H1a, H1b, H1c, H1d, H2a, H2b, H2c, H3) are supported. Details are shown in Table 3.

Table 3*Hypothesis Testing Results*

Path	p-value	Standardized Coefficients	Conclusion
H1a: The Leadership relationship type between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.000	0.27	Supported
H1b: The Helping relationship type between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.000	0.188	Supported
H1c: The Understanding relationship type between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.000	0.187	Supported
H1d: The Responsibility relationship type between supervisor and PhD students is positively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.01	0.09	Supported
H2a: The Uncertain relationship type between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.000	-0.197	Supported
H2b: The Dissatisfied relationship type between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.046	-0.076	Supported
H2c: The Admonishing relationship type between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.044	-0.088	Supported
H2d: The Strict relationship type between supervisor and PhD students is negatively associated with PhD students' satisfaction with their supervisor's supervisory style.	0.197	-0.04	Rejected
H3: PhD students' satisfaction with their supervisor's supervisory style is positively associated with their satisfaction with their academic skill development.	0.000	0.812	Supported

Discussions

Our findings have shown that PhD students' satisfaction with their supervisors' supervisory styles are influenced by the leadership relationship, the helping relationship, the understanding relationship and the responsibility relationship. This corresponds to existing studies which reveal a high correlation between PhD students' satisfaction and their relationship with their supervisors (Cockrell and Shelley, 2011). First, PhD students were found to be satisfied with their supervisors' supervisory styles in a leadership relationship type, shown in the importance of supervisors' structuring or giving clear guidance or direction to PhD students. This is in line with what has been confirmed in existing literature (de Kleijn et al., 2012; Helfer and Drew, 2013). Second, if PhD students are supervised in a helping relationship, they will be satisfied with their supervisors' supervisory styles. This has also been confirmed by numerous scholars (Cockrell and Shelley, 2011; Kulikowski et al., 2019). Accordingly, the supervisor's willingness to encourage or support PhD students will predict PhD students' satisfaction with their supervisory style (Dericks et al., 2019; Erichsen et al., 2014). Similarly, it is suggested that student satisfaction is related to supervisory support (Cornér et al., 2017; Pyhältö et al., 2015). Third, PhD students are satisfied with their supervisor's supervisory style because of the understanding relationship. This conforms to findings of Helfer and Drew (2013) that doctoral students highly value supervisors' sensitivity to and awareness of their ideas or their competence limitations. Saleem and Mehmood (2018) supported this view, affirming that a lack of mutual understanding with supervisors would lead to supervisees' dissatisfaction. Fourth, the positive impact of the responsibility relationship between PhD students and supervisors on their satisfaction with supervisory styles found in our study is also corroborated by previous researchers. In a study by Harman (2003), students liked freedom given by their supervisors. Therefore, supervisors were praised for their willingness to give students appropriate independence or responsibility (Erichsen et al., 2014; Heath, 2002). This is consistent with the conclusion drawn by Grant (2005) and Lee (2008) that supervisors' role should move the novice students through dependency and interdependency to full independence as a researcher.

Furthermore, the uncertain relationship, the dissatisfied relationship, and the admonishing relationship negatively influences PhD students' satisfaction with their supervisors' supervisory styles. This is further supported by Kulikowski and associates (2019) and Shuss (2012) who concluded that PhD students were dissatisfied when they were unclear about what were expected from them. Furthermore, our findings show that PhD students were dissatisfied with the dissatisfied and admonishing relationship types. It is unlikely that students will gain anything if supervisors have no trust for them or easily get impatient with them whenever they propose ideas or present research results. However, contrary to what was hypothesized, our study found no correlation between the strict supervisor – PhD student relationship and PhD student dissatisfaction. It is possible that PhD students may think that supervisors' strictness with them would force them to make more effort to gain improvements or to achieve their main goal.

The next finding is that PhD student satisfaction with supervisory styles will greatly contribute to satisfaction with the academic skills PhD students have improved. This further confirmed conclusion made by Harman (2003) or Heath (2002) that PhD students were satisfied with the development of their academic skills. This is because they were given effective feedback or encouragement for every effort they have made, resulting in higher satisfaction scores.

Results of this research is also consistent with other studies related to PhD students' expectation of their learning experiences. In Vietnam and other countries with the Confucian background

education, PhD students may expect their supervisors to provide very clear and detailed instruction in choosing a research topic, adopting a research methodology and thesis writing. Therefore, maybe some of them are not acquainted to the leadership, independent or responsibility/freedom supervisory styles at first. However, after the first year, there has been a transformation in Vietnamese PhD students' perception toward becoming self-directed learners who take primary responsibility for their PhD candidature (Nguyen, 2018) and show more satisfaction with this supervisory style. On the other hand, in Western countries (especially UK, US and Australia), students exhibit individualism and independent learning under the guidance and support of teachers (Loh and Teo, 2017). Therefore, PhD students in these societies tend to be satisfied with the independent and responsibility supervisory styles of PhD supervisors.

Practically, our findings will be of great importance to PhD program managers and supervisors. First, our findings could inform PhD programs managers' decision in selecting supervisors who can fit expectations of a positive relationship with PhD students. This will then indicate PhD students' satisfaction with their supervisory styles and their academic skill development. Hence, they could complete their PhD timely and successfully, which is a significant success factor of PhD programs. Second, PhD program managers should provide supervisors with general guidelines of standard supervisory styles. So far, at universities in Vietnam, PhD supervisors are chosen if they are PhD holders, associate professors or professors who are honored for their research competence. They are given no guidance of how to supervise PhD students. Instead, they may base on their own experience of being supervised in their previous academic studies or accumulate supervisory styles from supervising PhD students years after years. Such guidelines would help them ensure the efficiency of their supervisory styles. Third, supervisors would train themselves to develop leadership, support, understanding and responsibility relationship types with PhD students. Supervisor would also try to avoid uncertainty, ambiguity, indecision, impatience or distrust when they interact with their PhD students to discuss academic issues. Overall, PhD students will be provided with essential resources, support and encouragement to achieve main goals in their PhD candidature.

Reflections on implications for supervisor – PhD student relationship during COVID-19 pandemic

The data for this research were collected before the spread of the coronavirus pandemic (COVID-19). However, as COVID-19 has significantly affected learning and teaching in higher education (Crawford, 2021), there may be some further reflections on implications for the supervisor – PhD student relationship during and after the pandemic. Particularly, in the wake of COVID-19, most of the supervisor – PhD academic interactions have been shifted from face-to-face discussion to virtual mode. This transition has certainly posed challenges because face-to-face interaction is a better environment for active discussion. For example, doctoral students may suffer from chaos due to inconsistent communication with their supervisors, which will probably prevent them from maintaining routines or support from their supervisors (Suart et al., 2020). This section discusses several suggestions for both supervisor and PhD students during the pandemic.

First, technology has played a special role for remote learning in the current COVID-19 pandemic context (Guimarães & Lima, 2021). Therefore, supervisors and PhD students could take advantage of technology mediated communication systems to conduct frequent online academic interaction such as Whatsapp, Telegram, Skype or Google Meet (Pardo et al., 2020). These scholars also suggested that graduate researchers as well as doctoral students could also benefit a lot from online shared repositories, webinars and massive open online course providers such as edX, Coursera and FutureLearn. Second, an additional mechanism is for supervisors to create an online supervisory group with PhD students (Colpitts et al., 2020). In this group, PhD students will regularly share their

progress or updates on their professional development, research projects or accomplishments. This is a great source of mental support and motivation for PhD students during the pandemic, making them more satisfied with their supervisors' strong mentorship. Accordingly, supervisors could integrate adaptability to deal with unforeseen challenges in the new reality. Specifically, supervisors may consider adjusting their expectations and help PhD students adapt their research projects to fit the allocated time as well as producing significant scientific outcomes with proper guidance (Pardo et al., 2020). Furthermore, in the COVID-19 pandemic, besides the types of supervisory styles PhD students were satisfied with as indicated from our research findings, other scholars have suggested more types of support, including personal protective equipment and protocols, understanding and empathy, guidance and direction, timeline support, and financial support (Suart et al., 2020). Further research related to the supervisor – PhD student relationship should focus on examining how these types of support can both reinforce PhD student satisfaction and improve their performance.

Limitations and future research direction

However, this study also has several limitations. First, the context of delivering PhD courses in higher education system in Vietnam may be different from others in the world. Although our system partly inherits from advanced higher education systems, many adjustments have been made to fit the social and economic conditions of an emerging country like ours. Second, respondents for our study mostly studied or are in specific majors such as social science, business administration and economics. Therefore, findings may not be possible to be generalized to other countries or other majors.

Therefore, for future studies, PhD students' satisfaction with supervisory styles or with their academic skill development within their PhD candidature in other majors could be taken into consideration to make necessary comparison and contrast for separate practical implications for PhD program managers and supervisors. Second, other factors might influence PhD students' satisfaction such as their competence or academic research experiences before they start their PhD journey or even specific goals or purposes of PhD students. Future studies could investigate how these factors may influence PhD students' satisfaction with their supervisors' supervisory styles and with their academic skill development.

Conclusions

Our study examines how the academic relationship between supervisor and PhD students affects PhD students' satisfaction with their supervisors' supervisory styles and their satisfaction with academic skill development in Vietnamese universities. To the best of our knowledge, no previous studies have been conducted to explore this relationship. This research has significantly contributed to the existing literature related to the academic relationship between PhD students and supervisors by pinpointing positive aspects of the relationship which will help supervisors encourage PhD students to be more productive, effective and enthusiastic to complete their PhD candidature timely and successfully. In addition, results also indicate negative aspects of a relationship which supervisors should avoid. The high correlation between PhD students' satisfaction with their supervisors' supervisory styles and satisfaction with their academic skill development during their PhD journey was also clearly stated.

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Conflict of interest

The authors declare no perceived or actual conflict of interest.

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